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Fruit-Bud Development In Some Citrus Trees

Citrus fruit, Cultivation

By CHAS. E. ABBOTT

Professor of Horticulture, Florida College of Agriculture

Fruit production of any kind depends on the formation and proper development of fruit or flower buds. Without a sufficient supply of fruit buds it is obvious that there cannot be a bounteous fruit crop.

Studies of fruit bud development on deciduous fruit trees have yielded valuable results in that they have shown the possibility of adjusting methods of culture in such ways as to modify materially the quantity and possibly the quality of the crop of fruit. With this in mind, the writer undertook a study of fruit bud differentiation in citrus trees with the hope that the information gained would afford the basis for similar adjustments in the cultural practices with citrus. More efficient cultural methods, including fertilization, irrigation, and pruning, might be evolved from accumulated information on factors affecting fruit bud differentiation and related activities of the trees.

The bearing citrus tree has two types of buds — vegetative or growth buds, and fruit or flower buds. All buds when first formed are of the same character, and are vegetative buds. The fruit buds are differentiated — that is, certain of the vegetative buds change the character and

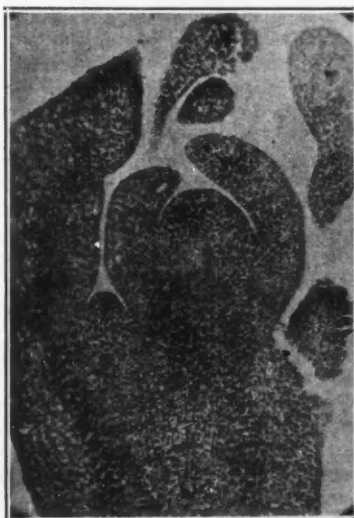


Figure 1

become fruit buds — when conditions within the tree become favorable. A period of bloom follows this period of fruit bud differentiation, naturally.

This study has shown that the differentiation or formation of blossom-buds in the grapefruit, sweet orange and satsuma does not take place

until the beginning of growth in the spring or upon the resumption of growth at any other season of the year following a period of environmental conditions favorable and of sufficient duration for the accumulation of a reserve food supply within the tree. Therefore the time of differentiation will differ slightly from year to year with climatic and seasonal variations.

The variation in time of differentiation is evidenced by the occasional blossoming of citrus trees during late summer or early fall when forced into growth following a prolonged dry period. The prolonged check in growth during the winter months in the absence of limiting factors seems to be especially favorable for bringing about the proper conditions for abundant blossom-bud differentiation during the spring, especially in grapefruit, orange and satsuma trees. This behavior is typical of some other tropical plants. As an example, workers at the Haitian Coffee Experiment Station have found that the floral buds of coffee mature during the dry season and the flowers open almost exactly eight days after the first rain subsequent to the winter dry season.

(Continued on page 20)

Metals That We Eat

New Information On Fertilizers By LEE VAN DERLINDEN, United Metal Selling Company, Chicago, Ill., In "Commercial Fertilizer"

At the outset I must tell you that the time allotted me does not allow for more than briefly touch on a few points, which will, I hope, stir you to ask for more information. Had I time I would like to describe the battle now being fought for business between various foods producers. I should like to tell you that celery producers increased their sales by 191,000 tons in ten years, lettuce producers by the stupendous figure of 653,325 tons, and tomato producers by 226,000 tons, and even the lowly carrot increased its sales in a decade by over 150,000 tons.

These are vegetables highly recommended by doctors as mineral carriers. You know best how your own sales have kept up recently, but perhaps new ideas may help; quality claims, backed properly, will gain sales. I can quote you offhand, 26 large concerns who base sales campaigns upon high mineral content and whose sales are growing each year. With 40 per cent of our cash earnings as salaries in the United States going into the foodstuffs which we eat, it most certainly presents an opportunity to food producers, who are willing and anxious to increase, rather than permit a decrease in the quality of foods for sale, and it is in this direction that my remarks are aimed.

We have just enjoyed an excellent luncheon but I presume few of us have reflected upon the peculiar chemical nature of the foods which we have eaten. I have in my hand a bar of copper and chromium. You should know something about these metals because, if the vegetables eaten were grown on properly fertile soils, they have contained such elements as Copper, Chromium, Vanadium, Sodium, Iron, Magnesium, Manganese, Calcium, Silicon and Sulphur.

All these metals, or elements, are included in every living creature.

When any organ or body is incinerated, these elements remain as ash, and the average of such ash in the body amounts to 4 1/2 per cent of the total weight, the bones carrying most of it, or approximately 5-7 by weight. In soft tissues, or muscles, the ash

constitutes about 8-10 of the moist weight. This ash consists of Chlorides, Phosphates, Sulphates, Carbonates, Fluorides, Silicate of Potassium, Sodium, Calcium, Magnesium, Iron, Copper, Zinc, and similar elements.

In the liquids of the body, the main salts are Sodium-Chloride, Corbanate, Phosphate, Potassium, Calcium, Iron and Copper. You will be interested in a complete chemical analysis of the blood and in knowing the constituents or muscle. The figures are by Dr. Locke of St. Luke's Hospital, of Chicago, 1932, whose figures I choose to accept, although Dr. Reicker shows in his analysis ten times as much Copper and Iron as I quote from Locke.

Blood contains metals, water and proteins: 810 parts water, 189 parts solids, 39 parts protein, 1/2 of 1 part Phosphoric Acid, 3 1/2 parts Sodium Oxide, 1/4 of 1 part Potassium Oxide, 2-3 of 1 part Ferric Oxide, 6-100 parts of Calcium Oxide, 5-100 parts Magnesium Oxide and 8-10 of 1 part Phosphoric Oxide, and quoting you in other terms, each ounce of your blood contains 2-1000 parts of Iron and also, 2-1000 parts of Copper, by weight.

The constituents of muscles are divided among the following elements: Proteins, Carbohydrates, Lactic Acids, Pigments, Ferments, Inorganic Salts, Chlorides and Sulphates, Phosphate of Sodium, Potassium, Calcium, Magnesium, Iron and Copper.

Dr. E. V. McCarthy of Chicago, famous as a nutrition authority, said in a conference recently that he had been started in his medical research by the susceptibility to infection being so greatly dependent upon the proper ratio of Iron and Copper in the blood. He also stated: "No man can tell you why it requires both Iron and Copper in the blood stream before either can perform its natural function. No man knows why this is so, but we know it is true."

I also learn from CHEMICAL ABSTRACTS, Volume 25, No. 14, of the inability of metals other than Copper, to supplement Iron in curing nutritional Anemia. In other words, gentlemen, as I have indicated previously, Iron alone in the blood does not suffice, neither does Copper alone, but together, in the blood stream, they are indispensable to health.

We know of many of nature's chemical, or secret formulae, but do not know the why of so many of them. This is one study which has not yet been finished, but Dr. McCarthy ended our conference with the statements that one sure way to end the American people's susceptibility to infection, is by supplying through food, a balanced ration of Iron and Copper and other metals, which are taken up in the human system. An organism supplied with a diet absolutely adequate, or preferably, in excess of all mineral requirements, may so utilize these elements as to produce immunity to infection quite beyond anything that we are able to produce artificially by our present method of immunization.

Dr. Arthur Soffel, a famous dentist of Chicago, tells that a deficiency of Calcium, Phosphorus, Potassium, Magnesium, Manganese, Iron, Copper and other such elements in the foods of today, is creating business for the dentist, as such foods falling below the level of proper mineral content, cause teeth to decay and induces Pyorrhea. He further states that mineral, especially iron, contents of feed, varies greatly, differing in the same food as much as fifteen-fold. Still further, in the doctor's opinion, there is less tooth trouble in summer while in winter canned vegetables are eaten to a great extent and it is his belief that many canned products do not contain adequate supplies of metals which we are discussing, due to depletion of the essential metals in our farm lands.

Dr. McCarthy writes: "If your foods are deficient in Copper, Iron, or other elements, you cannot make it up by using patent medicine for attempts to do so have resulted in severe poisoning. These requirements must be met by supplying foods known to contain adequate mineral supplies."

And, referring to commercial fertilizer, Dr. McCarthy says: "It is my belief (and to support this statement, I refer you to Hahn or Goring of Germany) that a well balanced fertilizer has a marked effect on vitamin content of plants." In Chemical Abstracts, Volume 27, No. 20, these men claim that properly balanced fertilizer distinctly affects the vitamin content of Spinach, and adds,

if fertilizer is not balanced, a decreased vitamin content follows, and in the same journal, No. 14, we are referred to an article. Journal of Agricultural Research, by Pater and Overholzer, in which they tell that Apples, receiving applications of balanced fertilizer, are a better source of vitamin than those from trees not so fertilized.

In this same Journal, McHorgue and Coffey tell that Boron is essential for the growth of lettuce. In Iowa, they discovered years ago that Copper is of great importance in animal nutritin, particularly in making it possible for the Iron in foods to be properly assimilated. The Kentucky Agricultural Experiment Station says: "Copper is associated with the substances that contain the fat soluble A factor. Protein separated from butter contains considerable Copper. Copper is a normal constituent of eggs, and of germs of all seeds, and is contained in small amounts in the livers of animals." Wisconsin Experiment Station Bulletin 410, shows Copper and Iron in foods as a cure for "Thumps" in pigs. "Thumps" is a common name for anemia, caused by a lack of Iron and Copper in the blood. A plentiful supply of Iron in the feed will not correct Anemia unless a small amount of Copper is contained also. Copper is essential in the diet if you are to keep the blood red and body vigorous. This element is acknowledged as one of the most essential requirements in human foods.

It may sound revolutionary, but now some of the keenest medical minds are beginning to believe that mineral deficiency of foods is one important factor in Cancer. Perhaps we may soon eliminate this scourge by properly balanced food.

You will be surprised to know that milk produced in this country today produces Anemia in short order when employed as an exclusive diet, although not long ago, measured in years, this was not true. This proves our soils to be exhausted of mineral elements necessary to health, for milk is a product of the soil, coming as it does from hay and grain. A complete chemical analysis of milk discloses the fact that Aluminum, Chromium, Copper, Iron, Magnesium, Lead, Tin, Titanium, Vanadium, Zinc and Silver in minute quantities are found in it. With all these elements contained, it is surprising that a whole diet of milk will cause Anemia. It must be true that the mineral content of milk has decreased in direct ratio to the number of years of continued agricultural practice.

The point I wish to make, gentle-

men, is that life in general whether it be plant, animal, or human, requires a certain amount of these various elements. This must be true, or they would not be contained in the blood, bone and muscle, nor would milk contain the eleven elements which you just heard described, in addition to some that were not listed such as Phosphorus, if these metals were not necessary in human and animal health. Nature makes no such gross mistakes as to include such elements or metals in milk or foods unless they have a definite place in the building-up of health and strength of the body.

Surely you will be surprised to learn that calf liver is not as good from a viewpoint of its ability to cure or lessen the effects of Anemia, when judged strictly from a viewpoint of Copper and Iron content, as are many vegetables or Bivalves, which contain a much greater Copper content than do liver Oysters contain 50 times as much Copper as does liver; winter wheat, 16 times as much; lentils and buckwheat, 3 times as much and even the humble cucumber as much Copper as does liver.

Zinc plays also an important part, both in plant pathology and in the human system. In the south, Zinc added to soils eradicates the Pecan disease, "Rosette", a metal deficiency disease. It plays an important part in your own system, for that part of the brain which records the memory, being in size no larger than a quarter, contains a large amount of this element, which like any other metals, enters the system only through foods.

Long time cultivation of soils and depletion of minerals has been traced as a direct cause of heart disease. I cannot go into details, as my time will not permit, but I know that in sections longest farmed Vitamins A. and D. are constantly decreasing in foods, and proof can be given you that mineral deficient soil produces vitamin deficient crops.

You might be interested in knowing that the Rath Packing Company, Iowa, has been stressing the same information over the radio as I am giving you today with the exception that they are calling farmers' attention to the fact that animal feed must contain these various elements if malnutrition and animal disease be avoided. Certainly you will agree, if they are good for the farm animal, surely they must be equally as good for the human animal.

Now that I have enumerated the various metals you have just eaten and some of their functions, I shall tell you more about them and their

relation to fertilizers.

The fertilizer business, as you know, is changing so rapidly no one can say that any new idea advanced is without value, and you now face another epoch in this business of buying plant food, one with which few are familiar. All over the world we hear discussions of rare elements, such as I have enumerated. With some of these we are familiar, but few of us understand all of them, insofar as their importance in plant growth and improvement is concerned. Formerly, it was thought these elements were present largely in all soils, but now we know that all soils may be deficient in any one or more of these metals, or may contain any one or more of them.

I want to stress the thought, gentlemen, that even if your soils do contain one or all of these elements mentioned, that many times, while present, they are not soluble to the plant. With these metals added to your fertilizer in proper form, root and bacterial action is so enhanced that these elements are quickly available as plant food.

Remember, the solid content of plants and fruit consists of about 9 per cent of Calcium, Sulphur, Vanadium, Chromium, Copper and other mineral elements, and you quickly understand that if a plant requires all these metals they must be present in such composition as to enable the plant to absorb them at precisely the exact time required. It is a fact that Nitrogen, Phosphate and Potash are not the only limiting factors in plant production.

Do not think this to be just one man's theory. I have a booklet on gardening, published by the largest producer of commercial fertilizer in the country, and in it I read: "that any one essential element present in the soil in a deficient quantity governs the yield of the crop produced, and if there is a deficiency of one essential plant food, maximum results cannot be obtained, even though all of the other essential foods are present in excess quantity."

These people stress Nitrogen, Potash, Phosphate, Calcium, Magnesium, Sulphur, Iron, Manganese, Sodium, Chlorine, and other elements. They do not offer this fertilizer for field use, but rather as a superior product; an adjunct to their other fertilizer business. So it has been possible for you to buy such a completely balanced fertilizer as we have discussed, for a number of years, but you cannot buy it at the same price as you pay for field fertilizers, as the price for

(Continued on page 22)

Neither Down Nor Out

Florida Citrus Industry Exhibits Achievements For Other Industries To
Admire And Envy

By R. B. WOOLFOLK

Vice-President American Fruit Growers Inc.

I am a distinct optimist with respect to the citrus industry. This not because I believe there are no more problems to be met, and some of them doubtless difficult, for no great and developing industry will ever be without its problems. The very processes of development and change create new problems as fast as existing ones are solved.

My optimism is founded on my faith in the capacity and the purpose of both growers and shipping interests composing the Florida citrus industry to focus accurately their attention on what may prove to be its real and vital problems, to correctly analyze them, to get a proper perspective in regard to them, and to discover and effectively apply satisfactory solutions to them.

I even indulge the belief that friends of the industry constituting the general public who are not directly connected with its operations will acquire a better understanding of conditions affecting it and a more accurate knowledge of its real accomplishments, and that in the future there will be less of a tendency to assume, as apparently has been a far too general assumption in the past, that every time a rough place in the pathway appears in the shape of unsatisfactory market conditions or otherwise, it is the result of either willful indifference or utter incapacity or inefficiency on the part of those attempting to handle the situation.

Such assumptions and the attitude they reflect or have a tendency to produce are regrettable, particularly because undoubtedly to a very large extent they have been founded upon inadequate knowledge or an insufficient understanding of the actual facts, because their tendency is destructive rather than constructive and helpful, and because the careless publicizing of them tends to crystallize widespread erroneous conclusions in the minds of the uninformed, both as to the nature and causes of the problems themselves and the very real difficulties of successfully solving them.

Suppose we have a moment's review. The Florida citrus industry has increased its productive capacity perhaps 400% within the past fifteen or sixteen years, and if proper consideration be given to disturbing factors such as the Medfly infestation and general economic conditions, the industry has demonstrated its capacity to develop an outlet for its rapidly increasing production at rather remarkably stable average results throughout that period. Frankly acknowledging that shortcomings and imperfections have existed, it is nevertheless true that few if any other staple industries outside of those based on new mechanical or scientific inventions, can show so good a record.

During the past two seasons in particular, financial results to citrus growers in general have been unusually low. In many instances they have been little short of disastrous. On the whole, under the conditions that have existed, neither growers, packing houses, shippers, speculators nor in fact dealers in terminal markets have been able to show profits. But regrettable as the facts have been, it is a mistake to assume that they were the result of either indifference to consequences or inexcusable inefficiency in marketing or distribution, without proper regard being given to the influence of freight rate structures to different market territories, the limited purchasing capacity of the people and other circumstances which were really the factors primarily responsible.

For two years or more prior to last July various types of manufacturing industries operated on a basis ranging from 15% to 35% of normal capacity, and yet were unable to market their reduced output at a profit. Had it been possible for the citrus industry to take similar action, perhaps it could have presented a better picture, but citrus production cannot be subjected to such arbitrary control. If a citrus grove be given reasonable care, which it must have for its physical protection, nature determines the volume output. As a consequence, throughout the period

of depression through which we have been passing our citrus industry has unavoidably operated on a basis of at least 60% to 70% of normal production, with the added necessity of disposing of its output in a seasonal market each year if at all. It is both interesting and enlightening to consider the prices at which steel products, for instance, or the product of any other single line of manufacturing industry might or could have been sold during the past two years had any such single industry been compelled to maintain its production at 60% to 70% of its normal capacity throughout that period and dispose of its output completely on a seasonal basis in the face of the unprecedented unemployment conditions and consequent low purchasing power of the general public which resulted from the enforced idleness in all other lines. Yet that is the situation which confronted the citrus industry.

It seems to me that these general considerations are timely and worthwhile. Their present discussion will have served its purpose if it helps all of us to get a correct mental perspective that will enable us to better understand the circumstances of the past and too approach with a saner, more patient and more confident outlook the opportunities of the future. We need not and should not be discouraged over problems to be met. On the other hand it would be foolish to refuse to see or to admit the valid basis of any real difficulties that may present themselves, to attempt to brush them aside as mere pretense, to ignore the legitimate limitations of conditions which we cannot control or to expect the unreasonable or the impossible from any prearranged mechanical setup or program, however carefully its formulation may have been attempted.

What then is the answer? My belief is that the answer is to be found in our ability and willingness to profit by experience and to utilize to the best advantage the facilities for orderly coordination of effort which are now at our disposal, supplemented by proper united action to develop

and maintain the marketing outlets to which our products are rightfully entitled. No mere program or programs will be self-operative for the purposes desired. It is a time for everyone to permanently lay aside purely selfish interests, to frankly accept facts as facts, to keep his feet on the ground, put his shoulder to the wheel, and cheerfully and confidently contribute his best for the general good.

Without the shadow of a doubt those who have their administration in charge will make every effort to render the industry regulations under government control as truly serviceable as possible. But of necessity that program alone, as any program, has certain limitations with respect to enhancing market values of our fruits. Its possibilities in that respect as it stands at present are based on the theory of limiting or controlling market supplies in one manner or another, contemplating the possible withholding of considerable portions of the crop from the markets in case of necessity to that end, and which although effective to a degree insofar as price level on the volume permitted might be concerned, nevertheless would obviously be only a partial answer to the broader problem of how to market all or the largest proportion possible of our total production of really merchantable quality. That means that the facilities for control of supplies to the markets should be supplemented by proper efforts to develop and maintain the reasonable capacity of our markets to accept maximum supplies.

Such accomplishment is strictly up to the industry itself and apparently can be brought about only by a consistent, carefully prepared and skillfully conducted advertising campaign of proper character and adequate proportions, supported by assurance that the citrus products which Florida sends to the markets will in fact measure up to and sustain the claims that are made for them.

The very important food values and medicinal properties of citrus fruits, particularly our Florida citrus fruits, coupled with the delicious palatability that has a universal appeal, constitute a combination of attractive properties that I believe is not equalled or paralleled by any other line of food products and which lends itself most readily to effective advertising.

I would not needlessly burden this discussion with details. But it is important for parents to know about the demonstrated value of citrus fruits and their juices in promoting

the growth of children, the proper development of bone and tissue, and particularly of strong, sound teeth and healthy condition of the gums. It is important for all, both old and young, to understand the value of these fruits in the daily diet for maintaining good health where it already exists, for rebuilding health and strength and vitality where depleted, and for numerous specific protective and corrective health purposes. This is particularly true with respect to the peculiar usefulness of grapefruit and grapefruit juice in maintaining the proper alkaline ratio of the human body, in correcting excess acid conditions where such conditions have arisen, and in the relief or treatment of various types of disorders resulting from or related to such conditions.

It would appear that we have in our citrus fruits a combination of attractive and beneficial qualities to offer the human race that is apparently unequalled, and it is high time that we make these things known to the people of this country in such a way that they cannot fail to correctly understand them, thus supplementing the valuable service already rendered in this direction by the medical and dental professions and experts on nutrition.

The importance and value of properly advertising the merits of our fruits should need no argument. Such advertising would undoubtedly pay for itself in results many times over. But as already suggested, in my view it is of utmost importance that such advertising effort be of the right kind, most carefully constructed and skillfully directed, so as to appeal to the reason and understanding of the people and avoid the excesses of exaggeration that only tend to raise questions of their truth and arouse possible controversy.

In a statement which appeared in the Tampa Tribune of September 14, 1933, I urged a widespread educational campaign for these purposes to be backed by the entire citrus industry of the state. I urged not only a nationwide campaign but also and particularly an active campaign right here at home in Florida for the bet-

ter education of our own home people as to the value of their own citrus products, as well as for the benefit of the hundreds of thousands of visitors from the north who are in our midst in mid-winter when these fruits are in their prime.

I quote here what I said in that statement as to my views of the character that such publicity campaigns should take, as follows:

"In my view, such general publicity effort as I refer to should be looked upon in a different way from the ordinary concept of an advertising campaign. It should be an earnest, carefully planned, truly educational program—not a mere series of advertisements urging people blindly to use our products but a presentation in understandable, truthful and attractive form of all the reasons why they should want to do so, including the desirability of competent medical or other expert guidance for best results under specific individual conditions that might exist.

"Neither extravagant statements nor fantastic reasoning would be needed nor justified either in order to maintain the interest or to produce the results desired, for with the merits of these fruits as a basis for discussion, the simple truth if well told would afford the most interesting and attractive advertising copy conceivable."

It is sincerely to be hoped that every grower and shipper in the state will see the necessity and possibilities in this situation and will lend both his moral and financial support to such an advertising program.

If all of us, both inside and outside of the industry itself, can keep our vision clear, so that we are not led astray by impractical expedients, and if we are willing to recognize our several responsibilities and unselfishly measure up to them, we are justified in looking forward with confidence to the future of the citrus industry in Florida, notwithstanding the problems which it may present from time to time. As I said in the beginning, I have faith in the capacity and ultimate purpose of both growers and shipping interests to do these things.

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RESTRAINING ORDER SET ASIDE

The injunction issued by Federal Judge Akerman restraining the Florida Citrus Control Committee from prorating shipments of citrus fruits, was temporarily suspended on February 10 by the United States Circuit Court of Appeals at New Orleans pending a final hearing on the appeal taken by the attorneys for the Control Committee. This hearing will be held on March 21.

Pending this final hearing on the appeal, the Control Committee will be permitted to function in all respects as fully as before the injunction was granted by Judge Akerman. However, at this writing no steps have been taken by the Committee to issue new orders of pro-ration, nor has there been any authoritative indication as to when such orders may be issued by the Committee.

In asking for a suspension of Judge Akerman's injunction, attorneys for the Committee set forth that following the issuance of the injunction and the suspension of restricted shipments, the price of citrus fruits to growers had dropped from \$1.00 per box on the trees to a price of 30 cents per box and that a continuation of the injunction would result in "irreparable injury" to the industry.

When the final hearing on the appeal comes up for hearing on March 21, the Control Committee will be represented by its attorneys, who will be assisted by representatives of the United States Department of Agriculture and by legal representatives of the Agricultural Adjustment Administration, under which authority the Citrus Code is operating.

Much had been hoped for through the operation of the National Citrus Code, but whatever benefits might have been attained under

the Code were nullified by the injunction granted by Judge Akerman, who not only ruled that the Committee had no authority to issue pro-ration orders, but that the creation of the Agricultural Adjustment Administration itself was unconstitutional.

In view of the great importance of the questions involved and of the acute interest of all connected with the industry, it is hoped that there may be a speedy decision by the highest courts to the end that the industry may reap whatever benefits are to be derived under the Code if its authority is sustained, or that it may be able to adjust itself through other means if Judge Akerman's injunction is permitted to stand.

ADVERTISING GRAPEFRUIT

As the result of activities of citrus leaders, chief among them are C. W. Lyons, R. B. Woolfolk and C. C. Commander, with a large following among the widely known citrus growers and shippers of Florida, a campaign has been launched for national advertising of Florida grapefruit in the principal centers of grapefruit consumption in the North and East.

The campaign is being financed by a levy of three cents per box upon the shipments of the signers of the advertising agreement, said to control considerably more than one-half of the grapefruit crop remaining on the trees.

It is the hope of the sponsors of this campaign to stimulate the use and sale of grapefruit and through increased demand to increase the price to the grower. Certainly some stimulation is needed—along with some system of handling which will lessen the spread between the grower who receives thirty cents per box for his fruit on the tree and the consumer who sometimes pays as much as thirty cents for half a grapefruit served in a dining car or in some metropolitan cafe.

The dream of an adequate advertising program for Florida citrus fruits has long been cherished by Florida growers and shippers, and the result of this initial step in such a program will be watched with interest. It is to be regretted that the fund available is insufficient to adequately carry out such a program for both grapefruit and oranges. However, it is a real step toward the accomplishment of this long cherished dream and may be the means of providing a greater fund and a more extended program later on. Every well-wisher of the industry in Florida is hoping that the results may be all and more than the sponsors anticipate.

TWO GREAT CITRUS SHOWS

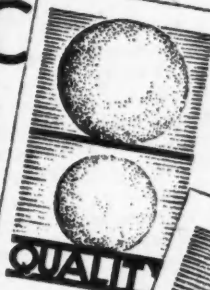
The Florida Orange Festival at Winter Haven and the Florida Fair at Tampa, both of which have become history since the last issue of The Citrus Industry, were shining exemplifications of the magnitude and importance of the citrus industry in Florida. Never before have such elaborate exhibits of citrus fruits been shown, and none who saw them could doubt the pre-eminence of Florida in citrus production—both in volume and in quality.



It's Our Story and we stick to it!
 1) We have always given proper recognition to the value of organics as a source of nitrogen and as soil builders.
 2) We have always advocated the use of guano, the best of all organic fertilizers.
 For years many men argued against the use of guano, now they are the same story for years ... and we stick to the same story.



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Compare Results



Compare RESULTS

THE truck grower finds out about fertilizers in a hurry. Four leaves come off of the calendar—120 days—and he has his answer in profit or loss. It's easy to compare results where Florida truck crops are concerned, so we call your attention to this fact:
 High organic fertilizers are producing the best income crops for truck growers. And growers who are using NACO Brand fertilizers will tell you that their score is uniformly higher because of the greater yield of better quality fruit.

Now when NACO Fertilizers show such good results in a few short months, it's easy to figure the benefits of these better, high-organic fertilizers to citrus over a period of years....a more fruit, better fruit. And, naturally, this is a challenge.

The final of the citrus grower is to compare results! This is a challenge. Compare the condition of NACO groves with those fertilized under any other program. Compare the yield. Compare the size and quality of the crop. And finally, compare the cost. This is the year to make comparisons because generally favorable growing conditions have given all fertilizing programs a chance to prove their worth.

This is a Challenge!

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IMPRESSIONS

By Frank Kay Anderson

We have a lot of fun with other folks at times . . . and at times we furnish the fun for others . . . for instance . . . recently serving upon the jury in Sanford we occupied prominent place in front of the corner of the jury box . . . it was a darky trial and Judge Ware was defending an ebony slicker charged with ab-squatulating with fifteen dollars belonging to a female lady of color . . . he got permission to call in a new witness, stating he did not know said witness' name or circumstances but believed he knew something of the case . . . a big, raw-boned darky, black as the ace of spades and with a peanut head, shuffled up to the rail . . . "Boy," said Judge Ware, "what is your name?" . . . Frank, sir," said the darky, shuffling his feet in embarrassment . . . "Frank what? What is your last name?" came the query . . . the darky shuffled and hesitated, Frank Anderson," he said . . . and the howl of delight which went up from the white section of that courtroom could have been heard a city block . . . Judge Jim Sharon, presiding, could be heard above all the rest . . . until suddenly remembering the dignity of his court, he pulled up with such a jerk that he almost swallowed his tongue . . . Speaking of courts reminds of the embarrassing situation of some drivers of trucks loaded with citrus shortly after the Control Committee's early orders went into effect . . . loaded with illicit cargoes they found themselves blocked by patrols on the northern boundary of the state . . . so they turned westward and braved the patrol along the Suwannee River, all alibied with the story that their loads were not intended for interstate commerce, but were destined for Pensacola, Marianna, Panama City or somewhere else in intrastate movement . . . and they got by with it . . . that is, for a very short distance until they were taken into custody by sheriff's officers for engaging in local truck hauling in Florida while operating trucks under foreign licenses . . . in as much as they had obligingly furnished the proof against themselves of such offenses a

short time before, they were right in the middle of a bad fix . . . we told you that chap L. P. Hickman was a slicker and a real enforcement officer, now those truckmen know it . . . Meeting with W. J. Howey of hill country fame . . . he was looking well and all tanned up, sufficient to warrant conjecture that he had been working out in the sun . . . but he owned up after a bit that it came from golf . . . we bragged that in the course of duty we recently had assisted in putting a formerly well known professional Florida republican in durance vile for certain illegal financial transactions . . . and W. J. bristled right back and wanted to bet that there were five Democrats in Florida jails for each Republican so confined . . . but we, too, had heard Moran and Mack as Two Black Crows tell about the white horses and the black horses, so we didn't take him up . . . A. E. Fowler of Lakeland, very busy indeed as one of O. G. Strauss' new assistants at Central Committee's headquarters in the Exchange building at Orlando . . . When is an orange not an orange? . . . Answer: When it is a Temple and oranges are being prorated . . . in that case it becomes a tangerine, according to some shippers . . . Earl Hunter as big as life and twice as natural, now running a new packing plant located in Apopka and selling to the truck trade . . . And Bob Carlton manager of the Plymouth Citrus Growers Assn. elected a director of the State Bank of Apopka . . . which bank now boasts Richard Whitney of New York and Zellwood as its president, and William Edwards as another director . . . Some discussion of the r e f u s a l of the AAA to allow the Florida Control Committee to handle an advertising fund for Florida Citrus, while that power was accorded to the governing board of the turpentine and naval stores industry . . . but somebody points out that the turpentine men were authorized to act for all their industry in whatever states located, while Florida asked only to act for Florida, in competition with other producing areas . . . Eldredge Clapp of Clapp & Clapp, owners of the Hi-

awasee Groves near Orlando, all hot and bothered because the prorate stopped their shipments to certain New York retail stores to which they ship their entire output under contract . . . and wondering what he'd do with "rights" to ship to Philadelphia, Boston and other auction markets where they have no customers . . . evidently the notion that because their fruit does not go through the auctions they ought to be excepted from the stipulations . . . Personal note to Messrs. David Sholtz, Nathan Mayo, et al and Al's brother: Please, please, pretty please next year let's have license plates which do not require rebuilding both old cars and new in order to affix the plates . . . seems license-plate salesmen could talk faster than our friends at Tallahassee were capable of thinking . . . or something . . . By the bye the Spring political pot beginning to bubble . . . the Hon Eugene F. Matthews of Starke out and making the rounds in the second week of January . . . a candidate for reelection as member of the State Railroad Commission . . . which project meets fully with our personal approval . . . we believe Gene Matthews has been a good man in the place, and pretty satisfactory to all concerned . . . Then some friends of H. Grady Zellner of Lakeland slip alongside and whisper inquiry as to what we might think of Grady Zellner as a candidate for State Commissioner of Agriculture on the next go around . . . we confess we hadn't thunk, but on such short notice it seems a plumb good idea . . . a good square shooter who probably knows more at first hand concerning agriculture and horticulture than any incumbent of that office in many a long year . . . and certainly knows his citrus . . . besides, if consideration be given to this great industry of the peninsula it is time enough a South Florida man had a chance at that job . . . Louis H. Jacobs of the Richardson Fruit Corporation, Ocoee, dropped in to an Orange ave. life-saving station in Orlando and inquired as to what kinds of beer they had . . . the waitress enumerated several well known brands and then paused whereat Lou

wanted to know if that was all she said there also was some imported beer, at which Lou brightened visibly and ordered a seidel of the imported beverage . . . nearly finished with it, he demanded to know where it had been imported from . . . the answer was, from Wilkes Barre, Pennsylvania K. C. Moore, ever-active county agent for Orange county at Orlando shows us some recently compiled figures covering the costs of orange production in Los Angeles County, California, from the agricultural authorities there, and no wonder they are worried to death by Florida competition in the markets . . . it surely costs real money per box to mature oranges in our sister state Wiley B. Coarsey of Tampa, that well known Hillsborough County grower just as full of vim and vigor as years ago, and plenty forceful T. A. Currie of Eloise, one of Polk County's best, and always trying to do his part for the growing industry Mr. Strine, the Winter Haven grower who got tired of getting little for his fruit, and tried an experiment of his own shipped his fruit to Champaign, Illinois, seat of the State University, and sold it mostly as juice direct to the public then meditating upon the wasted hulls ground them coarsely and with the aid of chocolate made a candy which appealed to local tastes . . . a lot of hard work, but a net return of seventeen dollars per box for his fruit, which made it worth while We've heard all the star-spangled orators of a couple of generations, William Jennings Bryan and John Temple Graves included, but never one to out-spangle Frederick E. Parks of Avalon Groves, Orlando . . . and the subject was fertilizer what would he do with some sentimental or patriotic subject? Louis C. Alsena, the Orlando grower who used to be a cotton factor in Savannah, believes uniformly better quality fruit must be the ultimate answer to Florida's citrus marketing problem Miss Nona Wyllie of Lake Mary wants all to know that as a grower she repudiates the right of Francis Whitehair of DeLand to appear as chief legal counsel for Florida citrus growers when he is counsel for one of Florida's largest railroads . . . Illusion shattered: Reilly M. Fletcher Berry the Florida author, who incidentally authored our best books of citrus recipes, wasn't christened Reilly . . . the Sanford lady who started life as plain Maria, but playmates changed it And James Whitcomb Reilly, a neighbor back in Indiana, asked that it stick at Reilly Theodore Meade, Oviedo

THE CITRUS INDUSTRY

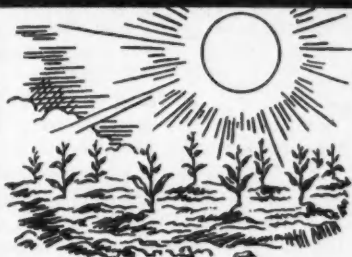
octogenarian, and one of this country's foremost entomologists and botanists, in very bad health as this is written, and his friends greatly worried Prior to the federal court procedure, some of the arguments for and against legality of the Control Committee and the Agreement rather remindful of the old story of the little cow . . . the fellow telling about her stressed her smallness "Why when that high-boy stood up from milking her, she could walk between his legs." . . . "Now you know no full grown cow could be that little," said another "But she was," claimed the first, "in fact, that cow was so small that a full gallon of her milk would just barely fill a pint bottle." Didn't get down to the Orange Festival to Winter Haven until Saturday, the last day, and thereby missed meeting a lot of growers we

Thirteen

are accustomed to bump into there went with the hope of hearing the citrus advertising discussion scheduled for that day but it did not materialize Missed Joe Lyons, for one had to pay for our own lunch which wasn't so bad, but also had to pay for the lunches for the quorum we had gathered for Joe's benefit that was boomerang stuff meantime Joe had ducked the entire Festival, and gone to Mobile went on a sailing vessel, and so made sure he couldn't get back before the Festival was over Winter Haven was still laughing over Governor Dave Sholtz' slip of the tongue when awarding the prize to the young lady winner of the orange packing contest with camera's clicking and news-reel sound apparatus grinding, he

(Continued on Page 18)

Fascinating Facts of NATURE — NO. 5



The ground is Nature's magic workshop. In the ground she brings seeds to life. In the ground she forms her jewels, her precious metals. In the ground she creates plant foods, fertilizer materials that are life-blood of farming in the South—potash—phosphate—and Chilean Natural Nitrate.



FOUR YEARS AFTER THOMAS JEFFERSON DIED AT MONTICELLO (1826) CHILEAN NATURAL NITRATE WAS FIRST USED TO FERTILIZE SOUTHERN CROPS.



NATURE PROVIDES FOR EVERYTHING. AGES AGO, BEFORE MAN INHABITED THE EARTH SHE CREATED CHILEAN NATURAL NITRATE AND AGED IT A MILLION YEARS SO YOU COULD HAVE IT FOR YOUR CROPS.

Chilean
NATURAL
NITRATE

The only nitrogen that comes from the ground.



Service Rendered To Citrus Growers By The Florida Agricultural Experiment Station

By JEFFERSON THOMAS

Service to the citrus growers of the state has been a principal objective of the Florida Agricultural Experiment Station throughout the nearly forty-seven years that have elapsed since the establishment of the institution at Lake City in 1887. In area occupied and with respect to problems confronted, the fruit industry of that time differed vastly from the present incarnation.

Groves then mostly were found far north of the existing heaviest plantings. Cultural and marketing methods were crude, and in large measure inefficient. Insect pests and plant diseases were less prevalent than they became later. While serious cold only recently had been experienced, the severest of the "big freezes" were yet to come. Output was increasing but only the far-sighted were concerned as to future relations between production and consumption.

Site originally chosen for the Experiment Station was poorly adapted to citrus investigations. Removal in 1906 and 1907 to Gainesville, where the agency was made a division of the newly located University of Florida, was in the direction of the bearing groves. Contacts with them of a more intimate type were facilitated when, in 1921, the Citrus Station was started at Lake Alfred. Studies of some kinds have been materially aided by the Sub-Tropical Station at Homestead, since it was organized, during 1930.

Doubt well may be held in respect to the status of fruit growing in Florida at the present time if the State Experiment Station had not been active through the past thirty or forty years. If the institution had not brought in the Australian lady beetle, for instance, what destruction might not the cottony cushion scale have wrought? The green citrus aphid and mealybugs are two of the numerous other insects, satisfactory measures for control of which the research at the Station has developed. Several of these pests otherwise doubtless would have been far more serious menaces to the chief cash-crop of Florida than they are.

Plant diseases affecting citrus likewise have been given constructive attention in the Florida Experiment Station program, with gratifying results. Blight, one of the earliest to

trouble growers, long was regarded as contagious. Station workers found that this impression was incorrect, and devised means for prevention of the difficulty. Whiteflies and scale lost much of their capacity for harm after it was learned that the "friendly fungi" that parasitize them could be artificially produced. When the institution and the State Plant Board arranged to furnish supplies of the fungi for whiteflies, at a nominal cost to grove owners, a further step forward was taken. The scale fungi later may be placed upon the same basis as regards distribution.

Melanose and stem-end rot investigations conducted by the Experiment Station first disclosed that these prolific causes of decay in packing houses and while fruit was in transit, were due to a fungous parasite. From the same source, it was found, came blemishes to the fruit and leaves on the trees in groves. Cultural practices and spraying methods were developed that afforded control to an extent reducing the loss in an estimated sum of over five million dollar annually. Work on the problem still in progress gives promise of additional efficiency in the treatment of these citrus troubles. Progress of an encouraging nature in that direction has been recorded during the past few months.

Economic phases of the citrus industry consistently have been given preferred position in much of the Station effort. Freight rate reductions recently obtained were in considerable degree the outcome of data collected in special studies of the subject prosecuted by investigators working out of Gainesville. Costs of production, as well as of picking and packing, have been clarified in informative inquiries extending over a number of years. Fertilizers and spray materials continually have been accorded consideration, in accordance with their importance. Utilization of by-products received impetus from study of the less well-known contents of citrus and of means for preserving the juices. Storage, shipping and maturity problems were in large part simplified through research into the underlying reasons for their existence. Scores and even hundreds of other handicaps in the growing of fruit have become more easy to conquer in consequence of Experiment

Station findings. Every department but one gives to the citrus industry year-round observation—and even the animal husbandry staff has been called on for advice as to the feed value of grapefruit and oranges in live stock production.

Work Recently Done

While the expenditures and the personnel of the Florida Agricultural Experiment Station have been reduced in the past two or three years, in keeping with the economy programs of the state and national governments the activities were not materially lessened. In several departments, more work than formerly was handled actually has been undertaken.

Credit is due to the self-sacrificing members of the staff for the splendid way in which they have met the situation. Salaries have been lowered, in most cases, from the none too liberal amounts previously paid. Yet practically without exception, the investigators have accepted additional duties in order that the growing needs of Florida agriculture might be supplied promptly.

In the department of agricultural economics, for instance, studies have been carried forward, with comparatively minor interruptions, pertaining to several important phases of citrus cost finding. Last season it was found that for the preceding seven year period, the expense of packing house operation in Florida had fallen from an average of 93 cents to one of 76 cents. Yet more than ten per cent of these costs remained the same—including taxes, interest, depreciation, insurance, telegraph and telephone, water, light and power.

Packing house rearrangement, in accordance with Station Bulletin 202, had been adopted in a large number of cases, it further was ascertained. Movement of fruit from the receiving platform to the car with the minimum of back-tracking is the main feature of the plans outlined in that publication. Increased use of conveyor service for carrying the fruit from machine to machine, and in moving empty field boxes, also was advocated. Two-story houses were advised against, statistics showing conclusively that these contribute to higher operating outlays.

Inquiry into the ways and means
(Continued on page 16)

... WHY NOT TRY AGRICO ON YOUR CROPS THIS YEAR?

MAYBE you know some of these growers? They farm different crops in different parts of Florida. They probably have never met but at least they have one thing in common. They use the same fertilizer—Agrico. And they say it will pay you well to use it, too. Just read what they have to say:



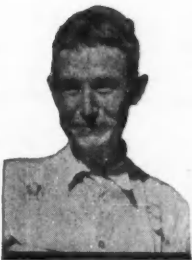
A. A. Seyler

A. A. Seyler, well-known trucker of Ft. Lauderdale says, "Last season, as you know, I used 150 tons of Agrico East Coast Trucker and during the season made many comparative tests. In several parts of my fields I alternated the rows—two rows of Agrico then two rows of some other popular make. In every case the Agrico produced a larger yield and a better quality crop. The results were so satisfying that I'm planning to use over 200 tons of Agrico next season. It's a great fertilizer."



R. L. Johnson

R. L. Johnson of Lake Wales writes: "After several applications of the old, standard type fertilizers I was not satisfied with the progress that my grove was making so I decided to try your special Agrico Fertilizer and it certainly supplied what the trees needed. I am so well pleased, that I have already laid out a program to fertilize with Agrico exclusively this year."



J. Akin Lee

J. Akin Lee of Fruitland Park is another grower who knows that Agrico means better fertilizer. Last season on 80 acres of watermelons he used Agrico for Truck in comparison with other fertilizers of the same analysis and he frankly states: "I used the different fertilizers to determine the merits of Agrico, compared to the goods ordinarily used in growing this crop. The final result was that the Agrico produced the biggest yield and melons 5 to 6 lbs. heavier than those produced by either of the other two fertilizers."

H. M. Aycock of Dania, tried Agrico on his tomato crop in comparison with another popular brand. He writes: "I estimate by the pickings that where I used the Agrico my yield was at least 1/3 more than where I did not use it. It paid me to use Agrico. And I heartily recommend it."



H. M. Aycock

Now if you've decided on the fertilizer you are going to use this season, we don't ask you to change your mind, we only ask you in all fairness to your crop, to try Agrico and compare the difference in results. On citrus it may take a little longer to see the difference than on truck crops, but what Agrico has done for other growers it can do for you.

Agrico is no new, untried fertilizer. It contains everything that made the Bradley and Bowker Brands famous, and in addition it contains extra plant foods that mean bigger yields, better quality and more profitable crops.



The AMERICAN AGRICULTURAL CHEMICAL Co.

Pierce, Florida



Alphonse Verschuere

Alphonse Verschuere, citrus grower, of San Antonio writes: "As you know, my grove was brought up entirely on Agrico for Citrus. This year the crop throughout the grove will average per tree over one box of oranges and two boxes of grapefruit. This is a splendid crop for 5-year-old trees, but what I am particularly pleased with is the quality of all the fruit. I am certainly sold on Agrico."

Max Cohen, of Palmetto, who shipped the first car of beans from Manatee County and the first car of cucumbers from the State this season, writes: "Last year and the year before I tried out Agrico for Truck against other goods and in each instance Agrico proved to be the best. It is for this reason that I used Agrico exclusively on my 150 acres of truck this year. Agrico costs a little more than some other fertilizers, but I find it pays to use it."



Max Cohen

"Our Picnic Groves have been fertilized exclusively with Agrico for the past two years," writes Manager L. P. Keen of Lithia, Fla., "and we're certainly gratified with the results obtained. Of course the best evidence of our complete satisfaction is that we have again specified Agrico for our full requirements for this coming season. Our trees which last year produced only 2,000 boxes of a poor quality fruit, have this year produced an estimated crop of 12,000 boxes of the finest quality fruit. You can bet that we want Agrico again."



L. P. Keen

And Reed A. Bryan, President of the South Florida Seed Co., whose sales of Agrico have increased, year after year, says: "It is a pleasure to sell Agrico for once a farmer uses it he is certain to become a permanent customer as it makes more money for those who use it."



Reed A. Bryan

SERVICE RENDERED TO CITRUS GROWERS BY THE FLORIDA AGRICULTURAL EXPERIMENT STATION.

(Continued from page 14)

whereby cooperative associations achieve success or sustain failure, which the agricultural economics department has had under way for some time, now disclosing facts of no small significance in citrus circles. Investigation into grove costs and organization, completed last year, gave a record that growers are finding of great value. Work remains to be done, however, in classifying the accounts according to soil type. Grove owners will continue to receive cooperation in keeping the most accurate records possible, and in determining the factors that affect their expenses.

Cover crop experiments in the department agronomy have been of increasing interest to citrus producers. A bulletin summarizing the results of seven years' observations was published during 1933. Findings are included in respect to the yields of the cover crops, the tree growth as affected by them, fruit output and soil changes. At the Citrus Station, Lake Alfred, the investigation has been enlarged and expanded. To the original thirteen plots, each about one-quarter acre in size, planted with pineapple oranges, thirty-two plots were added, all carry eight trees each of four varieties of grapefruit. In both instances, the trees now are approximately eight years of age.

Studies of "bronzing" or "copper leaf," the names adopted for a new citrus trouble in the absence of a better designation, were promptly instigated when its menace became apparent. Investigations under way are a joint project of the Florida Experiment Station and United States Department of Agriculture. Damage is done, as the descriptive phrases, by bronzing or copper coloring of the leaves, followed in some cases by loss of foliage and fruit, and by dying back of the branches. Surveys of a preliminary nature appear to have established that the heaviest ravages were in sections where drought has been most prolonged. Lack of feeder roots was found in the middles or beyond the edges of the branches near the surface of the ground, around affected trees.

Worth-While Discoveries

Matters vitally concerning the citrus industry daily must be given attention in the department of entomology. Recent worth-while discoveries included the finding that *Crotalaria striata* is an important summer food of Chinese ladybeetles—in

fact, is a chief means for carrying them through in groves where they have become established.

Experiments with lime-sulfur as a control for scale insects continue to show satisfactory results. A few months ago it was learned by the U. S. Department of Agriculture that the addition of a pound of iron sulfate to each fifty gallons of lime-sulfur gave a worth-while increase in the sticking properties of the material. Studies of the larger plant bugs on citrus also are making good headway.

Department of home economics investigations naturally have been directed towards the field of human nutrition. Work on the chemical composition of the ash in Florida fruits and vegetables is of special significance to citrus growers, in view of the growing emphasis placed on food and health values, in selling grapefruit, oranges and tangerines. Inquiry into pectic constituents has been completed, and the results compiled for publication in bulletin form.

Perfection of processes for cool storage of orange juice without sterilization has been a highly noteworthy accomplishment in the department of horticulture. Now ready for commercial use, these methods permit the extraction of the juice on a large scale, in especially equipped plants, and delivery to the consuming public in the same way milk is distributed, using the ordinary bottles.

Effect on oranges and grapefruit in cold storage of sundry types of wrappers has been developed most interestingly in experiments extending over several seasons. Moisture retentive wrapping material was found to have distinct advantages. Fruit in this type of wrappers was firm and unshrivelled at the end of five months while that in the ordinary tissue paper shrank badly within two months. Now the investigation is to be enlarged, and conducted on a semi-commercial scale.

Soggy breakdown of citrus fruits in storage was shown to come from an excess of carbon dioxide in the atmosphere. Prevention proved practicable through constant removal of the accumulated quantities from the respiration of the fruits. Grapefruit kept on a small scale in an atmosphere of nitrogen, and with the respiratory CO_2 removed by absorption, remained in excellent condition for five months, without deterioration in appearance or flavor. Apparently carbon dioxide is the only one of the gasses found in storage rooms that produces the breakdown.

Experiments With Fungi
Typical melanose lesions on grape-

fruit leaves and stem-end rot of oranges were traced by the division of plant pathology to a new species of the fungus *Diaporthe*.

Life history and distribution of this fungus are to be worked out, in order to determine whether the same methods of control will apply as the ones now in use for the diseases which *Diaporthe citri* causes.

Studies of the fungus causing citrus scab have been carried further, revealing a critical period in the life cycle, during which successful control can be obtained by applying Bordeaux in the manner recommended by the Station.

If evidence supplementary to the foregoing is required as assurance to citrus growers that the Florida Agricultural Experimental Station is serving them comprehensively and well, it may be had from the listing of the projects under way at the Lake Alfred branch during the last fiscal year. Investigations in progress included:

Control of melanose, stem-end rot, scab, and other citrus diseases.

Control of aphids, rust mites, termites, scales and other parasitic, citrus insects by means of sprays and introduction of beneficial insects,

Cause and control of die-back, Exanthema,

Covercrop and green manure studies,

Effects of different nitrogen sources in fertilizers,

Effects of varying amounts of potash,

Comparison of concentrated fertilizer materials with the commonly used sorts,

Effects of different types of cultivation,

Maintenance of variety of grove containing numerous citrus varieties.

Maintenance of citrus progeny grove of several varieties as a source of budwoods from citrus trees of known merit,

Tree spacing experiments,

Maintenance of topworked grove for experimental and demonstrative purpose,

Comparative tests of numerous rootstocks and their adaptability to the several commercial citrus varieties,

Collection and trial of the various acid fruits; breeding for new varieties,

Testing of numerous newly introduced species, varieties and hybrids of citrus and near-citrus.

(Growers are invited to visit the Lake Alfred or Gainesville Stations at any time, and to consult the workers either personally or by mail.)



If it's quick acting
fertilizer you want—

• Get this safe,
balanced kind

The spring season is one time of the year when a quickly soluble fertilizer may be used to advantage, provided it is a correctly balanced mixture containing the proper elements of plant food.

Imperial Top Dresser with Kaltrogen is a carefully blended, all-mineral Brand that will furnish your trees quickly-available energy at a minimum cost, and without subsequent harm to the soil. And Kaltrogen, which is an important part of Imperial Top Dresser, furnishes a host of secondary plant foods not found in ordinary fertilizers.

Whatever you're growing — citrus, truck crops, flowers, grass or ornamentals—you'll find a Gulf Brand to suit your exact needs. Gulf Brands are manufactured and formulated expressly for Florida soils and the careful selection and blending of materials assure safe, uniform crop nutrition throughout the year.

Of course, we unhesitatingly recommend regular Gulf Brands for the Spring application as well as for other seasons throughout the year. Such a program is always dependable. But where the need for economy suggests an all-mineral fertilizer for one application, use it in the Spring—and be sure it's Gulf Imperial Top Dresser with Kaltrogen. You'll find it excellent for side dressing truck crops, too.

IMPERIAL TOP DRESSER

• with *Kaltrogen*
Registered



THE GULF FERTILIZER COMPANY, TAMPA, FLORIDA

Dealers at convenient points throughout the State

IMPRESSIONS

(Continued from page 13)

called her, "Florida's fastest orange picker." . . . and had to do it all over again, requiring nearly a half hour . . . Never was our native quick wittedness better shown than at Winter Haven . . . and we saved a human life thereby . . . took a high class guy from Boston along, who doesn't know whether an onion is, or is not, a citrus fruit . . . then gathered up General A. H. Blanding of Bartow in the aisle just before lunch time . . . and just before we learned Joe Parentheses Lyons wouldn't be there . . . following old habit adjourned to the booth of the Catholic Women's Club for lunch . . . our lunches were bought, and then as a drink the guy from Boston ordered tomato juice fancy that at the Orange Festival . . . I saw the lady's face grow red, and a glint come into her eye . . . and she had a catsup bottle in her hand . . . so I looked pityingly at the bean from Boston and made a rotary motion with my hand to my head . . . the old Choctaw sign indicating wheels in the head . . . and General Blanding solemnly nodded confirmation . . . so the guy from Boston still lives . . . but he drank orange juice that noon . . . A big bread exhibit featured a cow which lowed in a very life-like manner . . . the signboard had a lot to say about Vitamins . . . and Reed Curry of the Florida Citrus Exchange, gettings a bit mixed, said that he had read a lot about Vitamins, but that this was the first time he ever had heard one . . . We paid sincere tribute to George T. Tippin of Fort Pierce for the Blue Goose exhibit of the American Fruit Growers Inc . . . undoubtedly the best in a long line of very excellent ones which he has created for the fairs . . . Frank Senn of Winter Haven active and energetic in connection with the booth of Florida Citrus Growers League, of which he is chairman of the executive committee . . . reporting steady progress and continued growth for that organization . . . how many know that Frank Senn is the citrus partner of Dr. J. H. Ross of Winter Haven, son of the late longtime head of the Florida Citrus Exchange . . . K. E. Bragdon's mustache . . . always a Festival feature . . . they make him a director to be sure he will be on hand and bring this feature of entertainment with him . . . Silver Nip Paul Stanton of Frostproof and his good looking wife . . . the old story of opposites . . . Walter von Loesseeck of the federal citrus by-

THE CITRUS INDUSTRY

products experimenters . . . and also his good looking wife . . . a well matched pair . . . and we sample some of the preserved orange juice . . . but no one yet has seemingly solved large scale production of juice in a manner to hold the full natural flavor . . . some interesting essential oils from the peel of oranges, grapefruit and from tangerines . . . some day these will be accepted commercial features of the industry . . . Earl Haskins who is now buying and shipping fruit in the Winter Haven area . . . in cahoots somehow with Fred E. Godfrey of Orlando . . . Earl upbraids us for not publishing something he told us at the time of last year's Festival . . . and the only comeback we can think of quickly is that we never have been able to print more than twenty per cent of what we see and hear . . . the old safety-first policy . . . Somewhere we pick up the news that Jeff Thomas is now engaged with the State Experiment Station at Gainesville . . . and we are very glad to hear it . . . And also we hear that John Moscrip, former Exchange advertising man, is now engaged in promoting a new automobile carburetor patented by a Miami man . . . Glad to meet Mrs Earl Haskins down the aisle in an orange juice booth . . . one of the world's most patient women . . . but we don't undersand about the lettering on that booth . . . it spoke eloquently of the desirability of an advertising campaign for Florida citrus fruit . . . then in another place a sign read : "Be A Sucker For 10c" . . . is that to be the per capita tax on each grower for the campaign? . . . And so, gathering the one from Boston into our car and home to our wife's house . . . but before closing about the Festival want to express our appreciation to Sol Wittenstein, the well known Scotch citrus grower of Orlando, for backing out at the last minute and not accompanying us . . . privately we are wondering if he knew that Joe Lyons wouldn't be there, and was minimizing his risks? . . . but he ought to know that mostly when we match we get stuck . . . A brief visit in Sanford with Joshua and S. O. Chase . . . and learn that shortly Chase & Co. will celebrate its golden anniversary . . . fifty years that the brothers have been in business together in the Florida citrus field . . . Mr. Sid Chase, S. O. to you, came to Florida first as factotum to General Sanford the founder of Sanford . . . in a short time he was habitually so full of red bugs that he wrote the older brother Joshua that Florida was all right if you

February, 1934

kept scratching, and the latter headed South forthwith . . . And W. A. (Billy) Loeffler of Chase & Co, the busiest mayor in Florida . . . Sanford owing eight million bucks and with something more than two thousand taxpayers, is guaranteed to keep a man thinking . . . One of those darned little birds whispers of a family huddle down at Gentile's in Orlando . . . Lawrence, Victor and Joe wondering aloud what in blazes we meant by pulling that photo electric cell gag in connection with their front door . . . well, we had to have a front door to pull it on . . . and the position of the Gentile front door afforded more privacy for those who were waiting to "see what happened", than any other we can think of . . . One well known Orlando gentleman caught waiting before the Gentile front door bought a lunch for a very high class gentleman on condition the waiter's name would not be mention in this column this month . . . At home, at the fairs, in other homes and at headquarters of the lady home demonstration agents of Florida we have tasted orange marmalade and such until we could pretty nearly qualify as an expert marmalade taster . . . but never have we tasted so good a marmalade as that called P O G M (standing for Perfection Orange Grapefruit Marmalade) which is made by the POGM Co., at Malden Massachusetts . . . it has neither the tartly partly bitter, taste of the British orange marmalades nor the excessive sweetness of most American kinds . . . take our word for it, the taste is just right . . . and very moreish . . . inquiry develops that it was perfected in the home of C. H. Moss of Malden, one of the foremost New England Baptist ministers, who gave up the pulpit to head the concern which now manufacturers and markets the product . . . We trust this Moss will gather plenty of rocks into the process . . . John T. Ezzard of Winter Garden clips a rhyme from an anonymous source and turns it over to us . . . We print just four lines of this little effusion, entitled In Crazy Land, as having particular bearing upon our agricultural and horticultural situation:

They raise so much in Crazy Land,
Of food and clothes and such,
That those who work don't have
enough,
Because they raise so much.

Citrus scab has a critical period, Experiment Station investigators have found. Control is successful when bordeaux is then applied to affected trees.

Coarsey New Head Of Growers League

At a recent joint meeting in Orlando of the executive committee and the directors of the Florida Citrus Growers League, Wiley B. Coarsey of Tampa was chosen as president of the organization to succeed H. G. Miller of Orlando. Mr. Coarsey is a well known Tampa business man, and a holder of a large acreage of grove property in Hillsborough county. He has been engaged in the citrus business for many years, and is well and widely known among the growers of the state.

Mr. Miller's letter of resignation was based upon the fact that in going to New York to establish distribution for the fruit from the groves he held by himself and associates in Orange County, he had found it advisable to remain there indefinitely and hence was unable to give proper attention to the affairs of the growers organization. He is reported now to be operating several retail stores for citrus fruits in the metropolitan area.

Howard G. Babcock of Orlando, a well known Orange County grower and president of the Orlando Chamber of Commerce was elected as director from Orange County to take Mr. Miller's place upon the board. Both Messrs. Coarsey and Babcock at once took on the duties of their offices.

Judge J. K. Whitfield, Orlando, as chairman of the League's contact committee with the Florida Citrus Control Committee, reported upon the work of his committee briefly, but inasmuch as the question of the Control Committee's authority then was to be adjudicated before Judge Akerman in the federal court within a few days no further line of action for the league was suggested.

Recapitulating the work of the league in general since its formal organization on September 1, F. W.

Butler, vice-president, Winter Haven, took credit on behalf of the league for the inclusion of four grower-members upon the Control Committee, which originally had been set up, he said, to consist solely of nine shipper representatives, and for the election of Irwin A. Yarnell, a grower early approved by the league membership, as chairman of that committee. He forecasted a strengthening of the grower representation on that body, in the event it is to be revamped following a possible adverse decision from Judge Akerman.

Activities of the league at Washington and at Columbia, S. C., on behalf of the growers, the speaker pointed out, had aided in obtaining two special citrus loan organizations in Florida to make federal funds available to the growers here; and he anticipated further enlargement of these, with longer term loans more suited to the needs of citrus producers.

Representations of the league at Washington and elsewhere to the end that citrus packing houses be continued, in common with other citrus operations, under the jurisdiction of the Agricultural Adjustment Administration rather than placed under the NRA were declared to have had gratifying success to that date, but the matter was said to be not yet definitely disposed of by the authorities.

A possible campaign, under guidance of Judge Whitfield, vice-president of the league in charge of taxation matters, during the next session of the Florida legislature looking to a revamping of taxation upon grove properties was touched upon, statement being made that this will be more fully developed later. Continuing growth of the league through increasing membership was reported to be more than satisfactory. Work of the Growers and Shippers League of Florida, the joint traffic organization of the citrus and vegetable growers and shippers of Florida, which recently celebrated its tenth birthday under the leadership of J. Curtis Robinson, was warmly commended, and the Florida Citrus Growers League was further pledged to the continuing support of the traffic body, with which the executives of the growers' organization maintains close contact.

In his recent speech of acceptance of the position of president, Mr. Coarsey told of recent personal experience

he had with the operation of a fruit store in Lexington Kentucky, to handle his own fruit. Better freight rates, wider distribution of Florida fruit and development of scientific and practical methods to reduce the spread in price between the grower and consumer, Mr. Coarsey declared to be paramount immediate necessities for the Florida industry; and indicated that action by the league looking toward such achievements would come in for first consideration during his administration.

In addition to members of the executive committee and of the board of directors a considerable number of growers from various sections were in attendance.

BROILED LIVER

To broil liver, cut it in slices $\frac{1}{4}$ inch thick, and wipe them with a damp cloth. Place on a greased baking sheet or broiling rack and put under the flame of the broiling oven. Broil slowly for eight to 10 minutes, turning frequently. When the liver loses its red color it is done. Add salt, pepper, and melted butter, and serve at once.

Cover crops of the leguminous types, grown summer and winter in pecan orchards by the State Experiment Station, increased the nut yield of the Frotscher and Stuart varieties by better than 100 percent.

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FRUIT-BUD DEVELOPMENT IN SOME CITRUS TREES (Continued from page 5)

The growth and fruiting habits of the Nagami kumquat differ somewhat from the grapefruit, sweet orange and satsuma in that the majority of the fruit buds formed for the crop of the current season are differentiated during late May and early June on wood that was formed during the spring of the current season. However a few flower buds may form on older wood which was produced during the previous season or possibly earlier. The failure of the Nagami kumquat to differentiate and push out blossoms in great numbers at the first flush of growth in the spring is evidently due to generic characteristics.

In the grapefruit and orange the greatest number of blossom-buds are formed toward the outer extremity of the last flush of growth on the branch, regardless of whether the flush of

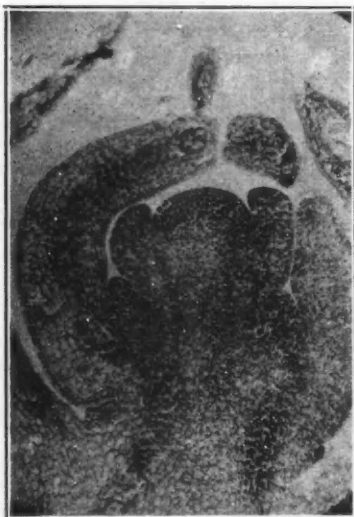


Figure 2

growth was made during the spring, summer or fall. However, blossom-buds have been observed to occur further back on the branches where the wood is much larger and older. This is especially true on trees that blossom very heavily following prolonged moderately dry seasons which apparently are most favorable for stimulating blossom-bud formation.

The "June bloom" or blossom buds which usually occur during the summer following a moderately dry period, are differentiated at the initiation of the June or summer flush of growth on trees or parts of trees that set few or no fruit during the spring. Buds collected in 1930 from the spring flush of growth on grapefruit trees from which the fruit set during

the spring had been removed, showed blossom-bud differentiation May 31. In 1931, June blossom-buds were not differentiated until about the middle of July. This evidently was due to the limited rainfall during the months of April, May and June, associated with a light set of fruit during the spring.

The materials used in this study were collected from trees growing on the grounds of the College of Agriculture at Gainesville, Florida. The varieties studied were the Duncan grapefruit, Pineapple orange, Owari satsuma and Nagami kumquat.

The collection of materials was started in November, 1927, and after that collections were made from orange and grapefruit trees at weekly intervals during the greater part of each year until March 16, 1932, with two exceptions. During late December, 1927, low temperatures destroyed the buds and in many cases killed the grapefruit and orange branches back for a considerable distance thus destroying all bearing wood. Then again in the spring of 1930 it was thought unnecessary to collect materials due to the weakened condition of the trees following the maturing of a very heavy crop of fruit

the previous season.

The satsuma trees were not injured as badly by the low temperature as were the grapefruit and or-



Figure 3

ange trees, therefore, it was possible to make a complete series of collections during 1928 as well as in 1929.

(Continued on page 25)



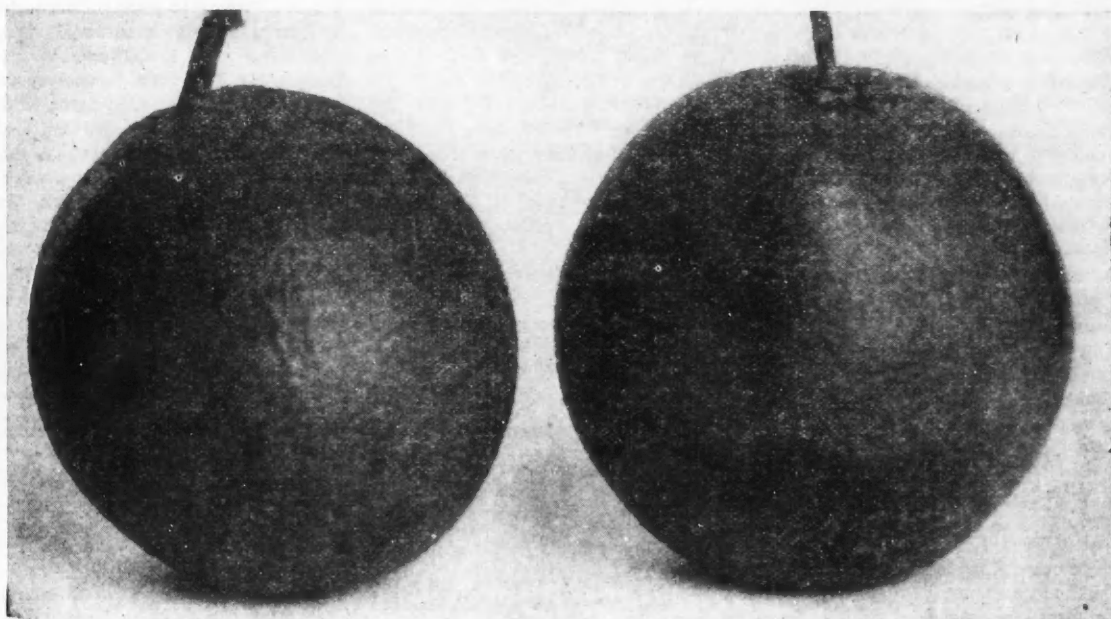
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spring application make sure you get fertilizer well-balanced with 10% potash, derived from **NV Sulphate of Potash**. It pays in increased yields and improved quality. *Remember, the New Deal Demands Quality!*

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izer to keep your grove producing regular crops of high-quality fruit.

3 Potash is the quality-producing element in your citrus fertilizer. It develops smooth tissues, fine grain, heavy sugar content and causes your fruit to put on excellent finish. **POTASH PAYS!**

METALS THAT WE EAT

(Continued from page 7)

this completely balanced mixture ranges between \$80 and \$120 per ton. I have used it myself with most excellent results.

It is reasonable that if this extra element fertilizer is best for golf courses, gardens, lawns and flowers, then it is worth to you, on your canning crops, as much as you now pay for just Nitrogen, Phosphate and Potash. You will be wise to insist upon mineral fertilizer when you buy your next season's requirements.

In 1930, Mr. Skinner, United States Department of Agriculture, published a story entitled: "The Relation of Rare Elements to Soil Fertility and Plant Growth." He says: "Heavy applications of inorganic fertilizer, while furnishing adequate supplies of N-P-K do not meet the deficiency of rare metals in soils." He adds: "For years elaborate fertilizer experiments have centered around finding the proper balance between the three elements, N-P-K, and in the proper use of them; profitable fertilizer practice has developed, but future fertilizer practice must take into consideration the role of Manganese, Boron, Copper, Zinc and other elements which may prove indispensable to plant growth and function, although these constituents are required only in small amounts.

According to Hilgard, a famous agronomist, 9 per cent of the dry content of Peas, Beans, Tomatoes or any other crop, is made up of Magnesium, Calcium, Sulphur, Manganese, Iron, Copper, Zinc, Arsenic, Iodine, Oxygen and other elements, which of course, mean a heavy drain of such elements from our soils.

In September, 1929, Clarkson of Florida, wrote that while it is not as convenient to make fertilizer containing all the necessary plant food elements, as to produce one containing only N-P-K, all leading authorities seem to agree that the time has come when we must readjust our methods and undertake to more fully cooperate with nature by the addition of elements other than N-P-K but they need other elements, some of which all soils lack and all of which are not abundant in any soil."

Dr. Northman, Florida, says many of the foods which we eat do not carry elements which they are supposed to contain, because the soils on which these foods are grown do not contain these metals. The doctor wrote that many of the diseases to which plants are subject are the result of deficiencies in diet, all due to soil mineral deficiency. Prior to 1929, the

doctor recommended that fertilizer be made up of Calcium, Iron, Aluminum, Manganese, Sodium, Magnesium, Potash, Iodine, Barium, and Copper. In 1932, Dr. Cohn wrote of English and Scottish experiments with mineral fertilizers such as I am discussing and dwells on the value of Iodine, Iron, and other elements as added to pasture lands for the purpose of producing more nutritious grass and hay which in turn produces a much healthier animal—better for food purposes.

Dr. McCarthy wrote on numerous occasions on the subject of rare elements being necessary in promoting growth in plants and animals. He stresses Arsenic as well as Boron, Fluorine, Silicon, Sulphur, Cobalt, and Copper and others. He believes the iron value of Spinach, Peas and Tomatoes is lost if these plants are not fed with this element. He tells that Iron values of these and other crops vary widely, being entirely dependent on the present methods of fertilization and upon the natural content of these and other elements contained in the soil. He says no phase of food production exists which cannot be vitally affected by the application of the various metals, together with the old triumvirate, and he has innumerable reference certifying the absolute

scientific proof involved in these ideas.

I assure you, gentlemen, fertilizer as made today differs greatly from that which you bought ten years ago. At that time all packers and producers of fertilizers stressed the fact that theirs was a product made from animal materials.

This material today is too expensive to use in a fertilizer, but is used for feed, and therefore most of the fertilizer you buy is a purely chemical product, and even if you find on the analysis a guarantee that a portion of Nitrogen contained is from organic source, you will find that while it is organic, yet it is purely chemical in that it comes from the air. When you sell a hog, sheep, horse, or cow, that is the last your farm ever sees of that much meat. The meat is sold to the public and the blood and bones fed to chickens and livestock, and practically none of it ever finds its way into commercial fertilizer. Thus every farm sells every year a certain amount of these precious elements which we are discussing, and each year the farm is that much poorer in potential productivity, unless you buy in commercial fertilizers such elements as will replace those which you have sold and which will

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never return to the farm.

I believe we are just at the stage where great progress will be made in proper mineralization of such plants as Peas, Celery, Corn, Tomatoes, Beans, Spinach, Cabbage and all canning crops, all of which carry Iron and Copper, Manganese and other metals. We know now that these metals mean a great deal to anemic people, so why not improve your vegetables and such desirable liquids as tomato and orange juice by increasing the amounts of such metals by applying them as fertilizer.

Do not conclude that because the science chemical research is relatively new, the fertilizer industry has not progressed during the last ten years, although much remains to be discovered in this direction. I might ask, does anyone here know just what oil is composed of? We know its origin, its uses, but do not know what makes up its component parts, so I say to you, do not reject that which you cannot understand, but accept the information as our college scientific men give it to you. If you do not, then the hundreds of millions that you and others as taxpayers contribute to the support of our state colleges and universities are being wasted.

Making peanuts a basic agricultural commodity under the Agricultural Adjustment Act and developing a production control program for the peanut growing industry have been recommended to Secretary of Agriculture Henry A. Wallace in a report by the control board provided for in the peanut marketing agreement now in effect.

United States citizens during the year just closed ate a half billion pounds more meat than they did the year before. This amounted to four pounds increase per capita, caused probably by the low price of meat.

The small child's jealousy of the new baby is often corrected by helping him to think of himself as the newcomer's protector rather than his rival.

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THE CITRUS INDUSTRY

AGRICULTURE GROUP PLAN FOR IMPORTED SOUTHERN FARMING

Gainesville, Fla.—The Association of Southern Agricultural Workers, in recent session at Memphis, Tenn., recommended that a division of cotton be established in the United States Department of Agriculture, proposed that imported oils and fats which compete with American products be properly taxed, and suggested that serious attention be given to encouraging farm ownership in the South.

The Association comprises 350 delegates representing the agricultural colleges, experiment stations, extension service, vocational education agencies and agricultural industries in 14 Southern states. A. P. Spencer, vice-director of the Florida Agricultural Extension Service, was chosen as a member of the association's board of directors.

Consideration was given to constructive developments affecting the welfare of the rural people of the South, particularly the agricultural adjustment program and other problems.

The resolution on cotton pointed out that this is the principal cash crop of two million Southern farmers, it is the principal agricultural commodity exported by the United States, and that scientific facts are needed as the basis for practical and economical cotton farming. Therefore, the creation of a division of cotton was proposed.

Increasing farm tenancy in the South was deplored as a serious menace to the future of agriculture, and encouragement by the government of farm ownership, through loans and other means, was suggested.

Since imported oils and fats make the sale of these by-products of agriculture unsatisfactory, it was recommended that methods be developed, through taxes or otherwise, that will protect the American farmers against competing importations.

BOARD OF CONTROL VISITS AGRICULTURAL RESEARCH STATIONS

Gainesville, Fla.—An inspection of branch stations of the Florida Agricultural Experiment Station system was a feature of the February meeting of the State Board of Control, February 10-13. The Citrus Experiment Station at Lake Alfred, the Everglades Experiment Station at Belle Glade, and the Sub-Tropical Experiment Station at Homestead were vis-

Twenty-three

ited and inspected by the members of the control board, who also comprise the State Plant Board.

Members of the board expressed themselves as well pleased with the work of the branch stations and the status of buildings, land and equipment, when they had completed the inspection.

They were accompanied on the four-day trip by presidents of the State's institutions of higher learning and by Dr. Wilmon Newell, director of the Agricultural Experiment Stations of the University of Florida College of Agriculture.

Members of the State Board of Control are Geo. H. Baldwin, Jacksonville, chairman, A. H. Blanding, Bartow, A. H. Wagg, West Palm Beach, Oliver J. Semmes, Pensacola, and Harry C. Duncan, Tavares. In addition, J. T. Diamond, Tallahassee, secretary of the board, Dr. John J. Tigert, president of the University of Florida, Dr. Edward Conradi, president of the State College for Women, Dr. C. J. Settles, president of the Florida School for the Deaf and Blind, and Dr. Newell accompanied the board members.

All of these branch stations for the study of problems of fruit growing, vegetable growing, and other agricultural subjects, have been established by the Florida Legislature since 1920, when the one at Lake Alfred came into being. The Everglades Station was officially established in 1923 and the Sub-tropical Station in 1930. All three have made excellent records in research on agricultural problems since their establishment.

"No nation has ever achieved permanent greatness unless this greatness was based on the well-being of the great farmer class, the men who live on the soil; for it is upon their welfare, material and moral, that the welfare of the rest of the nation ultimately rests."—Theodore Roosevelt.

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**TERMITE DAMAGE TO
BANKED CITRUS LESS
IF NO WOOD IN BANKS**

If citrus trees are banked with dirt that is free of rotting wood the chances of termite injury are greatly lessened, according to J. R. Watson, entomologist with the Florida Agricultural Experiment Station.

The termites will quickly begin work in the rotting wood and when it is shredded they will attack the live bark, girdling the trunk and causing death to the tree. Since most young trees are on newly cleared land it is necessary to take special precautions in banking them. The purer the sand used in the banks the better, but it likely will be necessary to use dirt in reasonable distance of the tree. Care should be taken to see that all stumps, limbs, and large

weed stems are removed from the banks.

Sometimes a coating of whitewash, if it is thin when applied and clings closely to the bark, will tend to prevent an attack of termites. Tree banks should be examined regularly and as soon as termites are noticed the banks should be torn down. A yellowing of certain trees should lead to inspection for termites. The unbanked trees are likely to be injured by cold but the risk is not as great as the damage the termites will do when once they are established. Do not leave the banks up any longer than is necessary for cold protection, regardless of the termites.

GRAPEFRUIT SALAD

Use 2 tablespoonfuls gelatine, ¼ cupful cold water, ½ cupful boiling

water, 3 tablespoonfuls lemon juice, 1 cupful sugar, 3 cupfuls grapefruit pulp and juice (fresh or canned), ½ cupful pecan meats.

Soak gelatine in cold water 5 minutes, then dissolve in boiling water. Add sugar and cool. Add lemon juice, grapefruit juice and pulp, and nuts. Let stand until mixture begins to thicken, mix well and turn into individual molds dipped first into cold water. Chill until firm. When ready to serve, turn from molds onto crisp lettuce on individual plates and serve with mayonnaise dressing. (Make the salad and dressing the day before and keep in the refrigerator.)

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FRUIT-BUD DEVELOPMENT IN SOME CITRUS TREES (Continued from page 20)

The kumquat buds were collected throughout the season of 1930.

Each collection consisted of from 30 to 40 twigs taken at random from each group of trees, from which four to six buds nearest the terminal portion were taken as a sample. Collections were made from the spring, summer and fall flushes of growth on Grapefruit, orange and satsuma trees.

The buds after being dehydrated were imbedded in paraffin and longitudinal sections, 12 microns thick, cut by the use of a rotary microtome. The sections were mounted on glass slides, stained and examined under the microscope.

The progressive changes that occur in buds of the several species of citrus studied are very similar. The accompanying photomicrographs of orange buds will suffice to illustrate the changes in all groups.

Figure 1 is a bud collected Jan. 6. It is in the vegetative state and shows no signs of differentiation. Note the smoothness of the curve of the growing point. The magnification is approximately 96 times.

Figure 2 is a bud collected Jan. 18 and represents a stage several days after differentiation has occurred. The equally balanced protuberances on either side of the growing point represent the sepals which are the first individual floral parts to be formed. The magnification is approximately 105 times.

Figure 3 is a bud collected Feb. 1, and shows a more advanced stage of the flower bud, with the rudiments of all flower parts laid down. The magnification is approximately 52 times.

PAPAYA LEAF SPOT BEST CHECKED WITH BORDEAUX MIXTURE

A number of letters about papaya leaf spot are being received at the Florida Experiment Station, and to Erdman West, mycologist, falls the task of answering them.

Black spot, Mr. West says, is one of the fungus diseases. It causes the papaya leaves to turn brown and have black spots over them, and is capable of defoliating the plants if not checked. The recommended way to check it, he says, is to spray every 10 days with 3-3-50 bordeaux mixture, using some good spreader like calcium caseinate to make the spray stick. If the lower leaves are badly infected they should be removed and burned before the spraying.

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Breakfasts, 20 to 50 cents. Luncheons and dinners, 50 cents, 65 cents and \$1. A la carte equally reasonable. American and Oriental dishes. Chop Seuy a specialty.

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CROTALARIA SPECIES SUITABLE AS FORAGE IS NOW AVAILABLE

Gainesville, Fla.—A species of crotalaria suitable for use as forage, sought since this plant came into prominence for soil improving purposes several years ago, has been found by the Florida Agricultural Experiment Station and the United States Department of Agriculture. The new species is called intermedia, and it is satisfactory for both soil building and animal feeding, according to an announcement by officials of the two cooperating institutions.

"Crotalaria intermedia, one of the newer introductions, bears promise as a cover crop for soil improvement and as a forage crop on lands adapted to its growth," the announcement stated. It makes an erect growth, the seems are less woody than those of striata, and the leaves persist until fairly late in the growing season. Yields of green plant material compare favorably with other common species of crotalaria.

The seeds of intermedia are small, mixed white and red in color, somewhat heart-shaped. Hard seed coats are common, and better stands are obtained by scarifying the seed before planting. The ordinary rate of seeding is from three to five pounds per acre, either drilled or broadcast, more seed being required in broadcasting than in row planting. Yields have ranged between $3\frac{1}{2}$ and 10 tons of green material per acre.

In the forage investigations at the Experiment Station, findings thus far indicate that the green plants are less palatable than some of the sweet succulent grasses, but cattle have grazed them at several stages of maturity. Artificially cured hay has been eaten in considerable amounts, and its possibility as a hay crop is being investigated further. The forage of intermedia has made satisfactory silage.

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For Sale—One used "Marsh" Stencil Cutting Machine; cuts half-inch letters. Also have ink pot, brush and liberal supply of blank stencils. Machine guaranteed in best of condition and to operate in every way comparable with a new machine.

Price, complete with accessories as listed, f.o.b. Tampa, \$50.

THE DURO CO.
1219 Florida Ave., Tampa, Fla.

THE CITRUS INDUSTRY

The best stage of maturity for harvesting as forage is being investigated.

Supplemental feeding is desirable, the officials said.

The Experiment Station has a limited supply of intermedia seed.

NEW CITRUS DISEASE SEVEREST IN AREAS WITH LONG DROUGHS

Prevalence of the new citrus disease, known for the want of a better name, as "bronzing" or "copper leaf" is expected to be greater following the recent dry weather in several of the heavy fruit producing counties of Florida.

Surveys conducted by the State Agricultural Experiment Station indicate that the trouble has been most severe in sections where drouth has been prolonged over a considerable period.

Bronzing or copper coloring of the foliage has been the forerunner, in some affected groves, of dropped leaves and fruit. Branches of the trees also have died back.

Growers who have noted the appearance of the disease will be pleased to learn that study of the causes and search for control means are well under way.

In the endeavor, the Florida Experiment Station is receiving cooperation from the United States Department of Agriculture.

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The rate for advertisements of this nature is only five cents per word for each insertion. You may count the number of words you have, multiply it by five, and you will have the cost of the advertisement for one insertion. Multiply this by the total number of insertions desired and you will have the total cost. This rate is so low that we cannot charge classified accounts, and would, therefore, appreciate a remittance with order. No advertisement accepted for less than 50 cents.

FANCY ABAKKA pineapple plants. R. A. Saeger. Ancona, Florida.

PUREBRED PULLETS FOR SALE—White Leghorns and Anconas ready to ship. Barred Rocks and R. I. Reds shortly. Several hundred yearling White Leghorn hens now laying 70%. Write or wire for prices. C. A. Norman, Dr. 1440, Knoxville, Tenn.

About 40 varieties of 12 species of holly are grown in Florida.

LAREDO SOY BEANS, considered free from nematode, excellent for hay and soil improvement. Write the Baldwin County Seed Growers Association, Loxley, Alabama, for prices.

C. O. D. Frostproof cabbage, onion and collard plants. All varieties 500—60c; 1,000—95c. Farmers Plant Co., Tifton, Ga.

DUSTER — Niagara, Air-Cooled engine Steel truck-mounted. Nearly new. Half price. Samuel Kldder, Monticello, Fla.

DETAILED SOIL Analysis, Interpretations. \$2.50. Soil Laboratory, Frostproof, Florida.

SCENIC HIGHWAY NURSERIES has a large stock of early and late grapefruit and oranges. One, two and three year buds. This nursery has been operated since 1883 by G. H. Gibbons, Waverly, Fla.

CABBAGE, Onion and Collard plants. All varieties now ready. Postpaid 500 for \$1.00; 1000 \$1.50. Express \$1.00 per 1,000; 5,000 and over 75c per 1,000. Satisfaction guaranteed. F. D. Fulwood, Tifton, Ga.

NEW COMMERCIAL lemon for Florida, the Perrine; proven. All residents need yard trees, keeping Florida money at home. Booking orders for budded stock for Winter delivery. DeSoto Nurseries, DeSoto City, Fla.

WANTED—To hear from owner of land for sale. O. Hawley, Baldwin, Wis.

SATSUMA BUDWOOD from Bearing Trees. Hills Fruit Farm, Panama City, Fla.

SEED—Rough lemon, sour orange, cleopatra. New crop from type true parent trees. Also thrifty seedlings. DeSoto Nurseries, De Soto City, Florida.

(TOBACCO)

FINEST HAND Picked Mellow Aged Long Red Leaf Chewing or Mild Delightful Cigarette or Pipe Smoking 5 pounds either only \$1.00. Perfect satisfaction strictly guaranteed. Pay when received. Morris Bros., Fulton, Kentucky

FOR SALE—Selected budwood and trees of Farris lemon, Tahiti lime, new varieties tangelos and other citrus. Ward's Nursery, Avon Park, Fla.

SEEDS—ROUGH LEMON, SOUR ORANGE, CLEOPATRA. Pure, fresh, good germination. Also seedlings lineout size. De Soto Nurseries, DeSoto City, Fla.

RAISE PIGEONS—Profit and pleasure. Illustrated descriptive catalogue postage six cents. Vrana Farms Box 314a, Clayton, Missouri.

CROTALARIA SPECTABILIS—Seed for sale. New crop, well cured, bright and clean. Price 25c per pound in 100 pound lots and over, 80c per pound in less quantities, f. o. b. Hastings, Bunnell, Lowell and San Antonio, Florida. F. M. LEONARD & COMPANY, Hastings, Florida.

WANTED—To hear from owner having good farm for sale. Cash price, particulars, John Black, Chippewa Falls, Wisconsin.

BUDDED trees new Florida commercial lemon, proven, thin skinned, juicy, scab immune. Also rough lemon, sour orange and Cleopatra seed and lineout seedlings. DeSoto Nurseries, DeSoto City, Fla.

SEND no money. C. O. D. Cabbage, Onion and Collard plants. All varieties 500—60c; 1,000—95c; 5,000 and over 75c per 1,000. Standard Plant Co., Tifton, Ga.

CLEOPATRA MANDARIN Seedlings 12in. to 18 in., \$10.00 per 1,000. Sour Orange lineout size, \$5.00 per 1,000. Grand Island Nurseries, Eustis, Florida.

CROTALARIA Spectabilis and Striata Seed. Fresh crop, cleaned, thoroughly scarified. Produced 5 years on highland. 12 1-2c per lb., \$10.00 per 100. Igou-Kauffman Crotalaria Co., Eustis, Florida.
An address before the Wisconsin Cannery Association, November 7, 1933.

March, 1934

THE CITRUS INDUSTRY

FREE PUBLIC LIBRARY
JACKSONVILLE, FLORIDA

Three

"Copper Leaf" Not A New Disease

Editor Citrus Industry,
Bartow, Florida.

Dear Sir:

In your issue of February 1934 you carried an article headed "New Citrus Disease" and stated it was known as "bronzing" or "copper leaf" and had just been discovered in Florida.

If it is a disease, it is not new, as Mr. J. R. Gunn, County Agent of Osceola County, and the writer have had it under observation for several years.

In October 1932 the writer made a trip to Washington to meet with the United States Department of Agriculture officials with an idea of securing assistance from that Department. While in Washington the writer met with Dr. Oswald Schreiner and Dr. J. J. Skinner and later had a conference with Dr. H. S. Knight, Chief of the Bureau of Chemistry & Soils. Dr. Knight gave the writer every opportunity to explain the situation here in Florida and promised to take the matter up with Dr. Newell of the Florida Experimental Station. This Dr. Knight did and at a somewhat later date a conference of the U. S. D. A. and the State Station officials was held in Gainesville and a plan for co-operation between the two Departments was outlined.

Mr. George M. Bahrt of the U. S. Bureau of Chemistry & Soils, who is stationed in Orlando, was instructed by Dr. Knight to begin a series of experiments and study in an attempt to correct this trouble. Mr. Bahrt has been engaged in this work for nearly two years and is conducting tests in several properties in Osceola and Orange Counties. He is carrying on numerous experiments with all of the various so called "rare" elements and we feel certain that within the course of time, if he is allowed to continue, he will solve the problem.

Dr. Knight, Dr. Schreiner and Dr. Skinner have all been to Florida making a study of this so called "copper

leaf" or "bronzing."

At the present time there is considerable discussion in the state relative to the use of zinc sulphate to correct this trouble and Mr. Bahrt is experimenting with different amounts of this mineral but as yet has been unable to detect any appreciable improvement.

The specialists in California have had zinc sulphate under observation for a number of years and have found that in quite a number of cases the use has been rather disastrous both when applied to the soil and when used as a spray.

Yours very truly,

CHAS. A. BARRETT, President.
Kissimmee Citrus Growers Assn.

Process for keeping orange juice in cold storage without sterilization has been perfected to the point where it is ready for commercial use, in the laboratories of the Florida Agricultural Experiment Station. Studies of the problem have been under way for several years.

Extraction of the juice on a large scale in specially equipped plants is made feasible, and delivery to consumers in ordinary milk bottles.

Basic conditions of storage are no different from the requirements for handling milk.

PENETROL
and
NICOTROL
At Your Dealer

"A FORM FOR EVERY NEED"

Where a complete fertilizer is required, which combines immediate action with long-lasting properties, we recommend:

NITROPHOSKA

TRADE MARK REG. U.S. PAT. OFF.

Seven different grades from which to select! The plant-food in Nitrophoska gets down quickly to where the feeding roots are and stays there until needed by the crop.

If you need nitrogen only, we offer you:

Calcium Nitrate

Calcium Nitrate is quick-acting nitrate nitrogen combined with soluble calcium. Increasing sales year by year tell the story of its crop effectiveness.

For both quick action and lasting effect use:

CALUREA

TRADE MARK REG. U.S. PAT. OFF.

Calurea is Calcium Nitrate combined with Urea, the Urea being in the same chemical form of nitrogen as is contained in liquid manure.

Prices on application

**THE JACKSON GRAIN COMPANY,
TAMPA, FLA.**

E. L. LORD

Consulting Horticulturist.
Grove Advisory Service.

Economical, Safe, Effective.

Why not give your grove a
break?

**P. O. Box 757,
Winter Haven, Fla.**



When Better Selling Methods Are Devised, AFG Service Will Introduce Them

From the time farmers hauled their products to market behind their own teams methods of selling fresh fruits and vegetables have improved steadily. Many present imperfections exist, but the advances of the recent past are guaranty of further and continuing progress.

It is significant that American Fruit Growers Inc. have contributed largely to the progressive improvements of recent years. Many present standard trade practices originally were pioneered and perfected by this organization.

Present day tendencies toward unification of action and practices are strong endorsements of the fundamental principles upon which the success of this organization has been built.

This great, nationwide organization enables coordinated effort and expert action earlier impossible. Its successful solution of problems of the immediate past is assurance of its leadership in the future. When better methods of selling fresh fruits and vegetables are devised, AFG Service will introduce them.

American Fruit Growers Inc.

Florida Division
Orlando, Florida